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LISTS OF SPECIES

Fish, Barra Bonita River, upper Paraná River basin, state of Paraná, Brazil.

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Abstract: The Barra Bonita River is an affluent of the left margin of the Ivaí River, upper Paraná River basin. Fish samples were conduced in November 2006 (spring) and in February 2007 (summer), in three sampling stations along the Barra Bonita River, using gill nets, casting nets, and sieves. Thirty one fish species were collected, which belong to five orders, 14 families, and 25 genera. Among them, five are probably new to science.

Introduction

Langeani et al. (2007) compiled available data on fishes from the upper Paraná River basin, based on data from fish collections, literature, and field samples. Those authors listed the occurrence of 310 species in upper Paraná River basin. Paranapanema and Ivaí rivers are the two more important tributaries of upper Paraná River at the state of Paraná. The Ivaí River basin has a drainage area about 35,845 km^2 and is the largest affluent of the upper Paraná River in the state of Paraná through 685 km (Maack 1981).

The Ivaí River is formed by the confluence of Patos and São João rivers, in the area comprised by the Serra da Esperança state park, at the division of second and third Paranean plateaus. The next river to join the left bank of the Ivaí River is the Barra Bonita River. It is an upland river in the second Paranean plateau with extension of 19 km. Most part of its course is narrow, with rocky bed, steep banks, and several waterfalls. Few fish studies have been carried at Ivaí River basin, mainly genetics (Zawadzki et al. 2004; Portela-Castro et al. 2007) and ecology (Luiz et al. 2003; Luiz et al. 2005).

The present study provides the first ichthyofauna check list from Barra Bonita River, and information about the discovery of five probably new species not listed by Langeani et al. (2007).

Material and methods

Fish samples were carried out in November 2006 (spring) and February 2007 (summer), in three sites with 100 m of extension each one at headwater (25°02'30" S, 51°04'03" W), middle (25°01'03" S, 51°01'45" W), and mouth (24°59'46" S, 49°59'35" W) of the Barra Bonita River (Figure 1). Fish were collected under license of IBAMA/MMA process # 11360-1.

Gill nets with different mesh sizes (from 1.5 to 6.0 cm opposite knots) were used. In littoral areas, sieves were operated during the crepuscule, and casting nets were used in rapids. Fish species were identified according to Graça and Pavanelli (2007). Classification of species is presented according to Eschmeyer (2006) for superior categories and Reis et al. (2003) for Neotropical families.

Voucher specimens of each species are deposited in the fish collection of the *Núcleo de Pesquisas em Limnologia, Ictiologia e Aqüicultura da Universidade Estadual de Maringá* (NUP), Maringá, available at http//www.nupelia.uem.br/colecao. Details about the examined lots are available at the Appendix, including the number of specimens and range of standard length (SL) in millimeters between parentheses, except for *Synbranchus marmoratus*, for which is presented its total length (TL).

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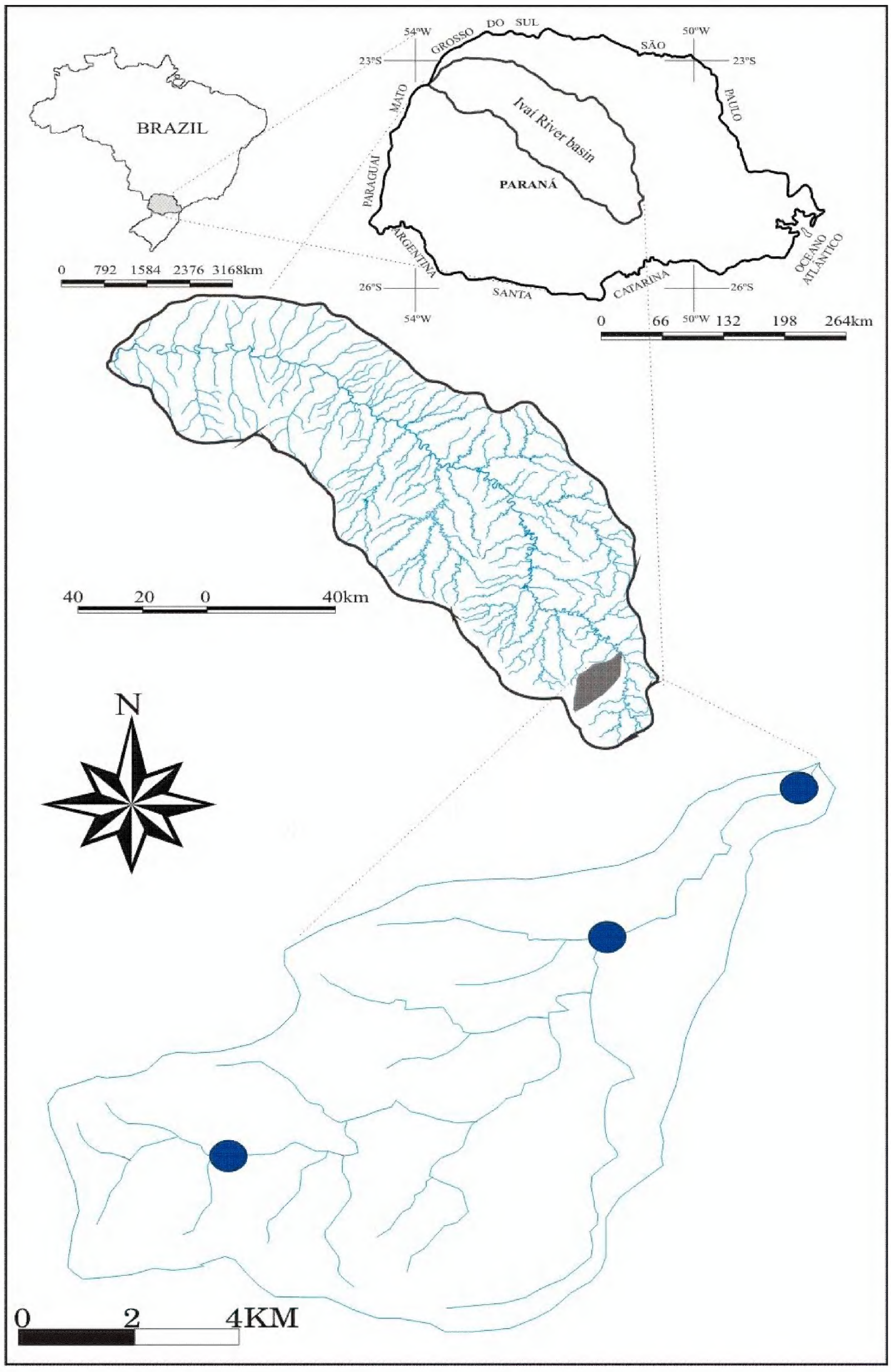

Figure 1. Barra Bonita River at the Ivaí River basin, state of Paraná, Brazil indicating sampling sites (blue dots).

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Table 1. Fish species from the Barra Bonita River, upper Paraná River basin. The asterisk indicates fishes that occur after the building of Itaipu Dam reservoir in accordance to Graça and Pavanelli (2007). Regional popular name of each species is provided.

Order Characiformes
Family Parodontidae
Apareiodon affinis (Steindachner, 1879) – *canivete*
Family Curimatidae
Cyphocharax nagelii (Steindachner, 1881) – *sagüiru*
Steindachnerina brevipinna (Eigenmann & Eigenmann, 1889) – *sagüiru* *
Steindachnerina insculpta (Fernández-Yépez, 1948) – *sagüiru*
Family Anostomidae
Leporinus amblyrhynchus Garavello & Britski, 1987 – *piau*
Family Characidae
Astyanax altiparanae Garutti & Britski, 2000 – *tambiú*
Astyanax bockmanni Vari & Castro, 2007 – *lambari*
Astyanax sp. aff. *A. fasciatus* (Cuvier, 1819) – *lambari-do-rabo-vermelho*
Astyanax sp. aff. *A. paranae* Eigenmann, 1914 – *lambari*
Aphyocharax sp. – *pequira*
Bryconamericus sp. aff. *B. iheringi* (Boulenger, 1897) – *lambari*
Odontostilbe sp. – *lambarizinho*
Oligosarcus paranensis Menezes & Géry, 1983 – *saicanga*
Roeboides descalvadensis Fowler, 1932 – *dentudo* *
Family Acestrorhynchidae
Acestrorhynchus lacustris (Lütken, 1875) – *peixe-cachorro*
Family Erythrinidae
Hoplias sp. aff. *H. malabaricus* (Bloch, 1794) – *traíra, lobó*
Order Siluriformes
Family Auchenipteridae
Glanidium cesarpintoi Ihering, 1928 – *bocudo*
Family Callichthyidae
Corydoras aeneus (Gill, 1858) – *limpa-vidro*
Family Loricariidae
Ancistrus sp. – *cascudo-roseta*
Hisonotus sp. – *cascudinho*
Hypostomus sp. aff. *H. ancistroides* (Ihering, 1911) – *cascudo*
Hypostomus sp. – *cascudo*
Rineloricaria cf. *latirostris* (Boulenger, 1900) – *rapa-canoa*
Rineloricaria cf. *pentamaculata* Langeani & Araújo, 1994 – *rapa-canoa*
Family Heptapteridae
Pimelodella avanhandavae Eigenmann, 1917 – *mandi-chorão*
Rhamdia quelen (Quoy & Gaimard, 1824) – *jundiá*
Family Pimelodidae
Iheringichthys labrosus (Lütken, 1874) – *mandi-beiçudo*
Pimelodus heraldoi Azpelicueta, 2001 – *mandi*
Order Cyprinodontiformes
Family Poeciliidae
Phalloceros harpagus Lucinda, 2008 – *guaru, barrigudinho*
Order Synbranchiformes
Family Synbranchidae
Synbranchus marmoratus Bloch, 1795 – *muçum*
Order Perciformes
Family Cichlidae
Geophagus sp. aff. *G. brasiliensis* (Quoy & Gaimard, 1824) – *cará*

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Results and discussion

Thirty one fish species belonging to five orders, 14 families, and 25 genera (Table 1) were collected, among which five species are probably new to the science. The most representative order was Characiformes, with six families and 16 species, followed by Siluriformes, with five families and 12 species, a common trend in Neotropical rivers (Lowe-McConnell 1999). The species with the higher number of specimens collected were *Hypostomus* sp. aff. *H. ancistroides* (Ihering, 1911) (26 specimens), *Rineloricaria* cf. *pentamaculata* Langeani & Araújo, 1994 (24), *Astyanax* sp. aff. *A. fasciatus* (Cuvier, 1819) (20), and *Astyanax bockmanni* Vari & Castro, 2007 (19).

Langeani et al. (2007) listed 50 probably new species from the upper Paraná River basin. However, our studies in the Barra Bonita River indicated the presence of additional new species not listed by those authors. Such findings demonstrate that increasing sampling efforts in the upper Paraná River basin, some new species still could be discovered, mainly in its tributaries. Additionally, the fact that the three most common species captured presents uncertain taxonomic status reveals the unsatisfactory knowledge of the headwater fish community from the upper Paraná River as a whole.

Two species recorded herein, *Roeboides descalvadensis* and *Steindachnerina brevipinna*, were not reported to upper Paraná River before the building of the Itaipu Dam (Graça and Pavanelli 2007), but nowadays are frequently captured in many rivers from that basin (authors pers. obs.). Some hypotheses to tentatively understand this phenomenon can be raised: a) those species invaded the upper portions of the Paraná River since the Itaipu flooding and are now colonizing most tributaries of the upper Paraná River basin; b) those species already exist distributed throughout upper Paraná River basin in small densities but some environmental modifications triggered population density augmentation; c) the former scarcity of fish surveys in Paraná River tributaries could have underestimated the ichthyofauna from the basin in the past and those species were not registered before because their preferential sites were not accordingly sampled. None hypothesis is necessarily exclusive and these factors can be operating together to the current distribution.

Regarding new species issue, ichthyologists performing surveys in small rivers could face to three kind of data: a) area augmentation of a wide-ranged species as *Aphyocharax* sp. and *Odontostilbe* sp. – two new species waiting for a formal description by R. S. Lima (*Aphyocharax*) and L. R. Malabarba (*Odontostilbe*); b) new species currently restricted to and distributed along the Ivaí River basin, such as *Hisonotus* sp., under description by C. H. Zawadzki, W. J. da Graça, and H. A. Britski, and; c) a first record of a new species, as *Hypostomus* sp., that differs from all other species of *Hypostomus* whether from the Ivaí River basin or from the Upper Paraná River basin. The fact that the survey of the Barra Bonita River matches these three situations in revealing fish diversity reinforces the necessity of a continue sampling efforts on every single drainage from the Neotropical rivers.

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Appendix 1

Voucher list: **Characiformes** — *Acestrorhynchus lacustris*: NUP 5541, 3 (139.8-148.9); *Apareiodon affinis*: NUP 5539, 5 (85.90-107.80); *Aphyocharax* sp.: NUP 5550, 2 (26.6-39.6); *Astyanax altiparanae*: NUP 5540, 6 (53.4-87.2); *A. bockmanni*: NUP 5525, 19 (64.0-75.1); *Astyanax* sp. aff. *A. fasciatus*: NUP 5526, 20 (64.0-92.2); *Astyanax* sp. aff. *A. paranae*: NUP 5535, 6 (62.3-78.5); *Bryconamericus* sp. aff. *B. iheringi*: NUP 5532, 6 (56.5-60.7); *Cyphocharax nagelii*: NUP 5530, 7 (103.9-115.8); *Hoplias* sp. aff. *H. malabaricus*: NUP 5547, 6 (87.5-189.0); *Leporinus amblyrhynchus*: NUP 5554, 3 (102.6-142.2); *Odontostilbe* sp.: NUP 5533, 3 (64.1-70.9); *Oligosarcus paranensis*: NUP 5536, 14 (85.0-120.0); *Roeboides descalvadensis*: NUP 5531, 7 (66.5-91.8); *Steindachnerina brevipinna*: NUP 5538, 2 (81.9-92.1); *S. insculpta*: NUP 5529, 3 (63.7-89.7). **Siluriformes** — *Ancistrus* sp.: NUP 5542, 3 (48.8-84.2); *Corydoras aeneus*: NUP 5549, 1 (20.5); *Glanidium cesarpintoi*: NUP 5543, 3 (76.8-82.3); *Hisonotus* sp.: NUP 5548, 3 (33.1-35.7); *Hypostomus* sp. aff. *H. ancistroides*: NUP 5546, 26 (46.5-180.1); *Hypostomus* sp.: NUP 5528, 1 (140.6); *Iheringichthys labrosus* NUP 5554, 2 (111.3-127.8); *Pimelodella avanhandavae*: NUP 5553, 4, 27.4-89.6; *Pimelodus heraldoi*: NUP 5534, 5 (94.8-136.8); *Rhamdia quelen*: NUP 5545, 6 (126.1-153.8); *Rineloricaria* cf. *latirostris*: NUP 5527, 2 (119.9-141.2); *Rineloricaria* cf. *pentamaculata*: NUP 5537, 24 (62.3-118.8). **Cyprinodontiformes** — *Phalloceros harpagus*: NUP 5551, 1 (20.7). **Synbranchiformes** — *Synbranchus marmoratus*: NUP 5552, 1 (108.6). **Perciformes** — *Geophagus* sp. aff. *G. brasiliensis*: NUP 5524, 4 (63.3-88.7).